

Mosquito Control Measures for *Aedes aegypti* and *Aedes albopictus*



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Mosquito Vectors



Aedes albopictus



Aedes aegypti



Aedes albopictus Behavior

- Primarily daytime biters
 - Feeds on humans as well as other mammals and birds
- Very aggressive
- Short flight range
- Eggs can overwinter



Aedes aegypti Behavior

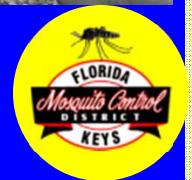
- Primarily daytime biters
 - In Key West:
 - Peak activity was recorded between 8:00am-10:00am & 4:00pm-6:00pm
- “Stealth” biters
 - Not very aggressive
 - Ankle-biters
- Short flight range



Common Larval Habitats

- Domestic and Natural habitats
 - Anything that can hold a tablespoon of water
 - Plastic containers & bags
 - Plant trivets
 - Flower pots
 - Fountains
 - Garbage cans
 - Tires
 - Tree Holes
 - Rock Holes









Surveillance for *Aedes aegypti* & *Aedes albopictus*

- o What we are used to...



Surveillance for *Aedes aegypti* & *Aedes albopictus*

- o More precision...



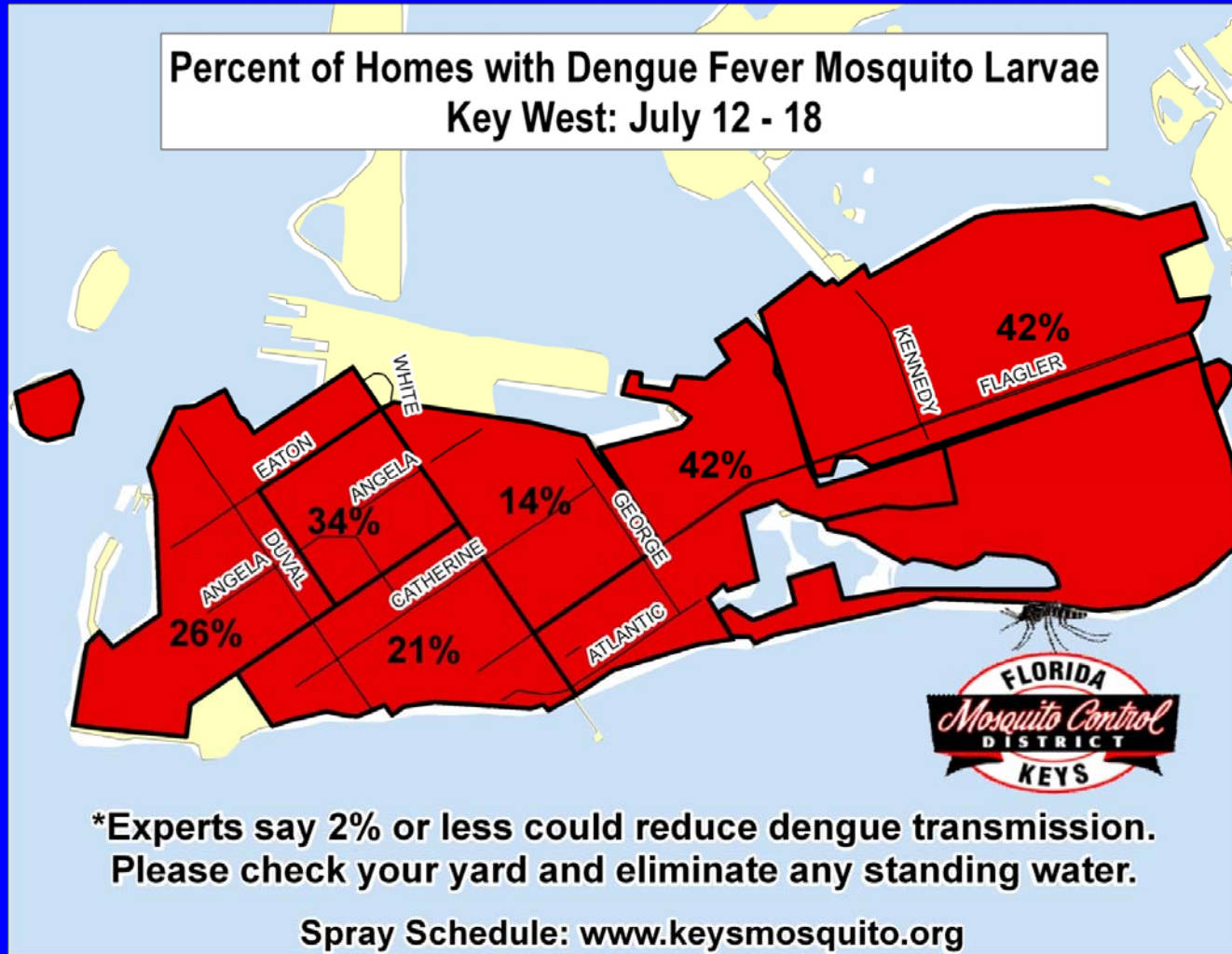
Surveillance for *Aedes aegypti*

○ Larval surveillance

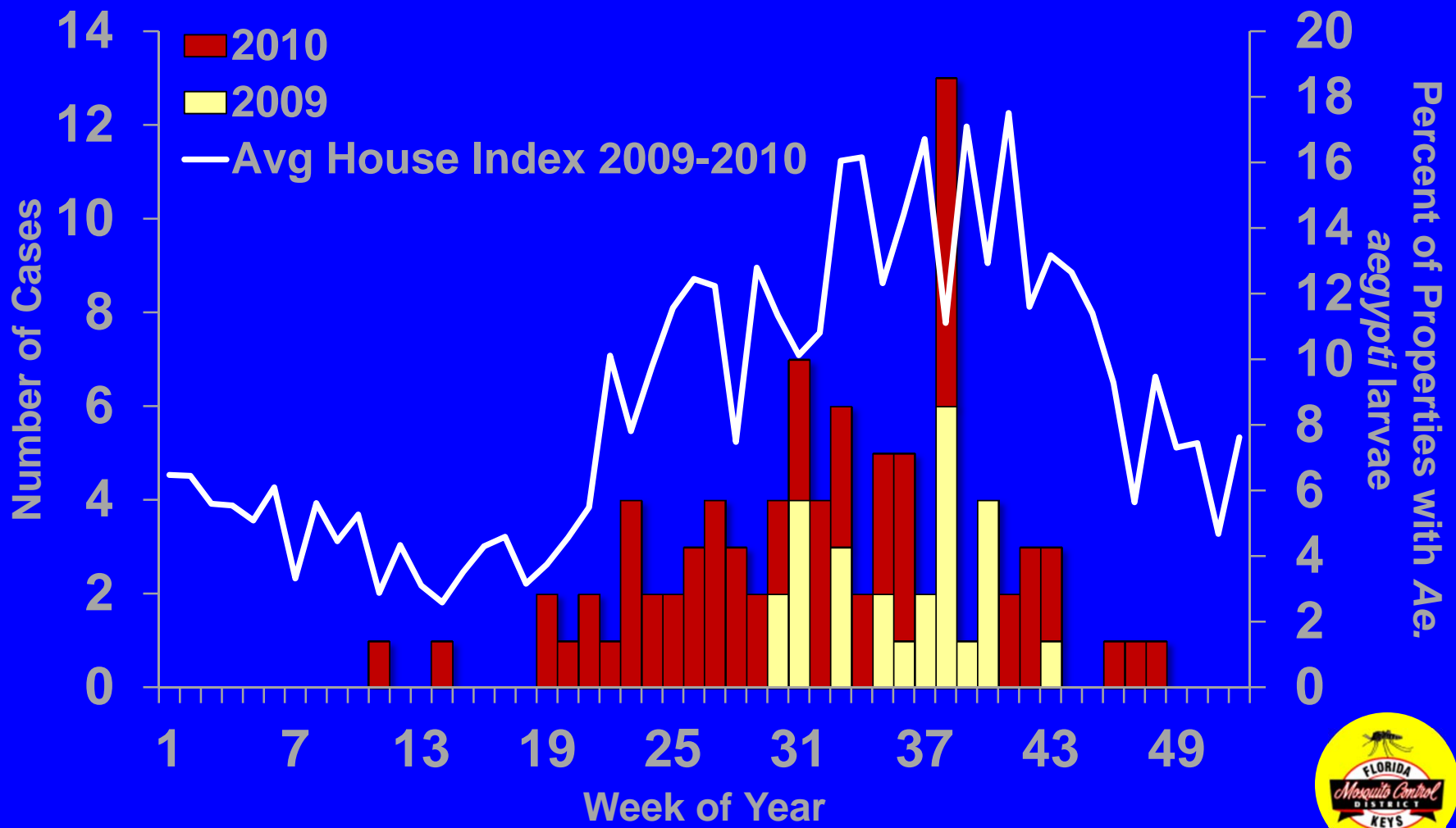
- Labor intensive
- House-to-house
 - House Index (% of homes positive)
 - Container Index (% of wet containers positive)
- Easy way to explain to the public where the problem areas are located...



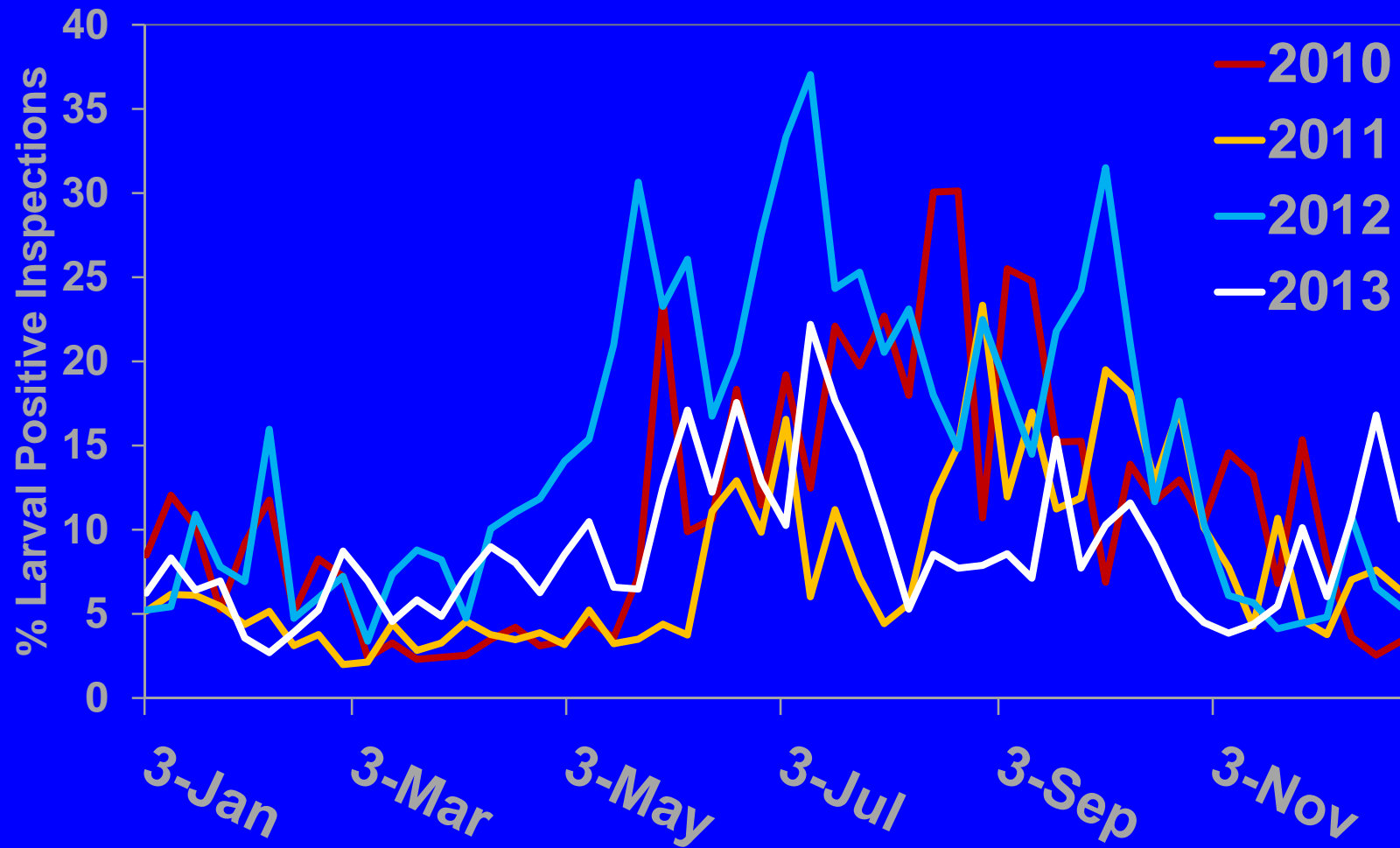
Advertisement in Local Paper



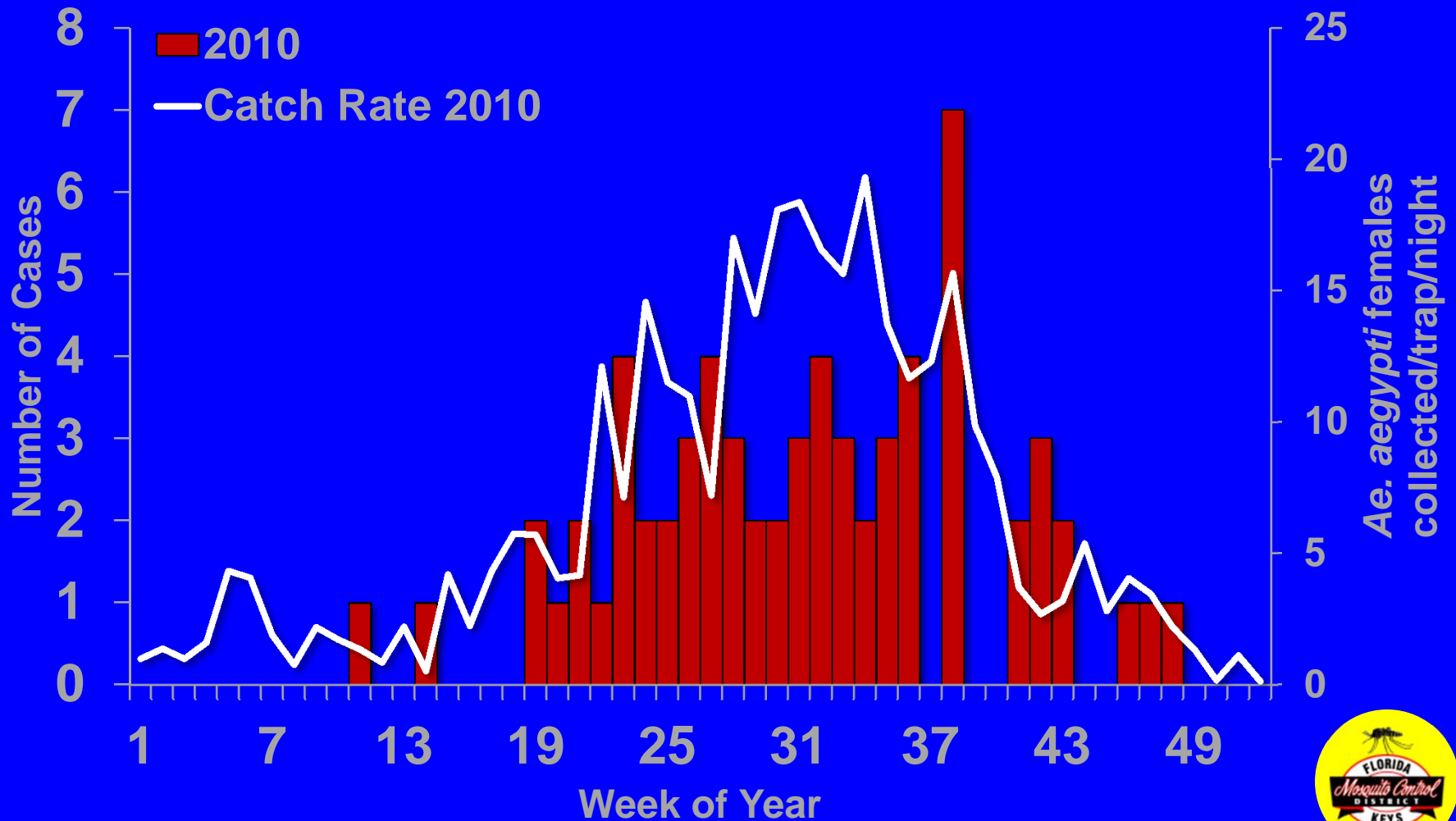
Epidemic Curve vs. House Index



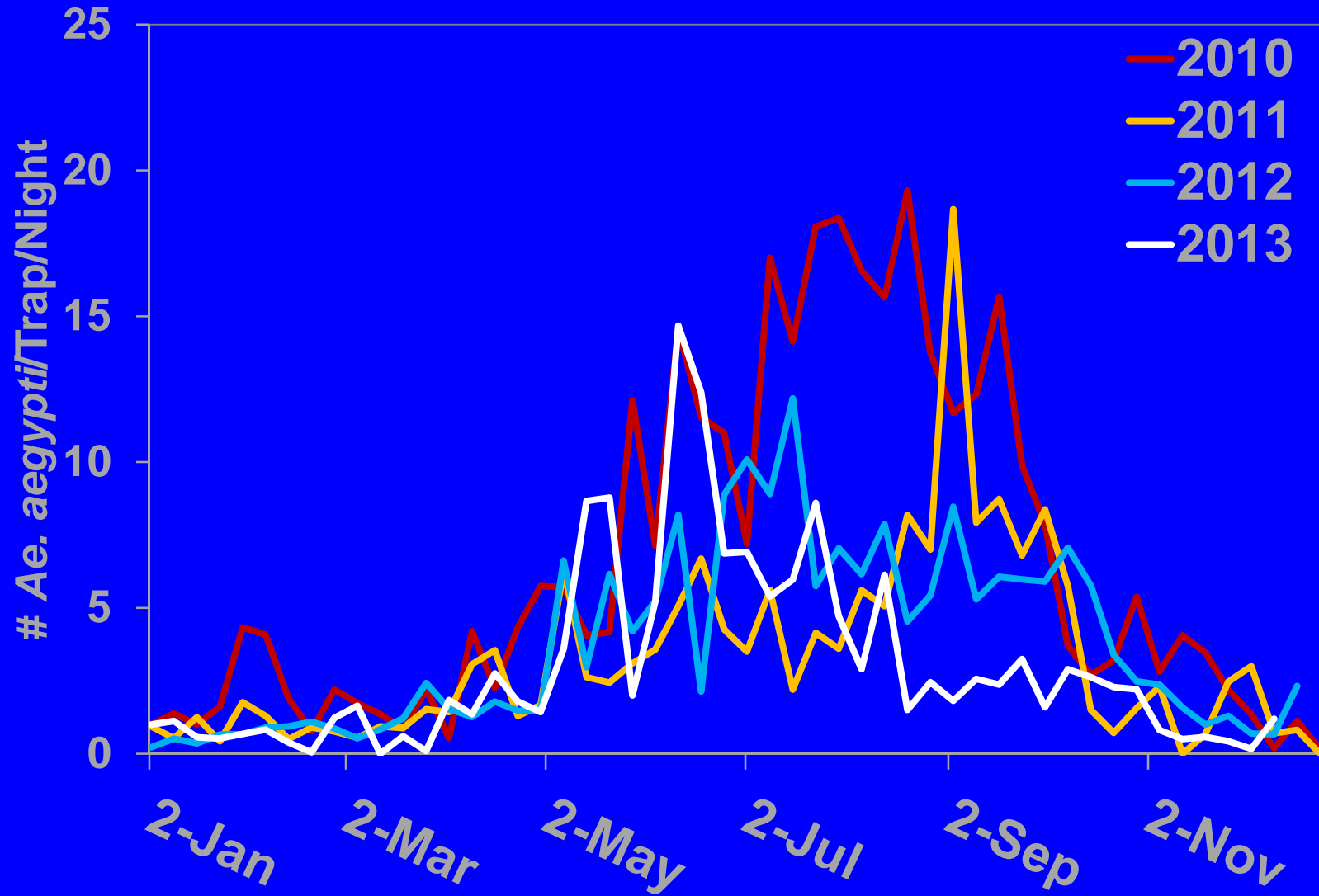
Key West House Indices by Week: 2010-2013



2010 Epidemic Curve vs. Weekly Catch Rate



Key West *Aedes aegypti* Weekly Catch Rate: 2010-2013



Control Methods: Larval Control

○ House-to-house

- Treating every container
 - Need access to all properties
- Requires a lot of manpower
 - FKMCD dengue response:
 - 20-26 employees/day
 - 6 weeks to cover 3x5 area 3x's
- Public did not like weekly visits



House-to-House Larval Control

- Use residual products whenever possible
 - More time before return visit
- Be thorough
 - One container can affect the area
- Educate the homeowners
 - One-on-one chance to show homeowners how to take care of their own property to avoid mosquito production



Larval Control: ULV applications



Larval Control: ULV applications

○ Advantages:

- Broad-area covered in small amount of time
- Target-specific products available
- Greater public acceptability

○ Disadvantages:

- Cost
- Timing: immediately before or after rain best



Truck and Aerial Spraying

- Little/no measurable results in traps
- Difficult to reach due to behavior
 - Key West: Many open houses
 - Timing of spray is critical
 - Difficult to perform day-time spraying due to public



Handheld ULV Applications

- Highly effective
- Time consuming
- Need a good number of:
 - People
 - Handheld units
- Need access to all homes



Thermal Fogging

- Smaller droplets
 - Stays elevated longer
- Cloud allows for better efficacy
 - See where it travels
 - Better coverage
- Weather is a big factor
 - Wind, temperature
- Access to all homes?



Barrier Treatments

- Good potential for important areas
 - Ports
 - Shared outdoor spaces
 - What are the main areas of introduction??
- Longer residual
- Vegetation for harborage



Domestic Mosquito Control

- Relatively difficult
- Varies by area
 - Human habits
 - Mosquito habits
- New methods on the horizon
 - Genetically modified mosquitoes
 - Wolbachia infested mosquitoes
 - Auto-dissemination traps



Adult *Aedes aegypti* & *Aedes albopictus* control

- Know your population
 - Many instances of resistance
 - Test your population often
 - Know their behavior
 - Key West is different
 - Trial by error
 - Test new methods before deploying operationally



Acknowledgments

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○ Valent BioSciences

